



B.Tech IV Semester Supplementary Examinations, July 2024

**ELECTROMAGNETIC THEORY AND TRANSMISSION LINES
(ECE)**

Maximum Marks: 70

Date: 27.07.2024 Duration: 3 hours

- Note:
1. This question paper contains two parts A and B.
 2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.
 3. Part B consists of 5 Units. Answer any one full question from each unit which carries 10M.
 4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal marks (10X2M=20 Marks)		CO	Bloom Tx
1	Define capacitance. What is the energy stored by the parallel plate capacitor?	1	L1
2	Define electric potential.	1	L1
3	Explain displacement current density?	2	L1
4	Write the Maxwell's two equations for Magneto static fields?	2	L2
5	Define the term "Uniform plane waves."	3	L1
6	Define polarization. List out various polarizations.	3	L2
7	List any four types of transmission lines.	4	L1
8	How does group velocity vary when compared to phase velocity?	4	L1
9	Define VSWR. And write the range of VSWR.	5	L2
10	What is the significance of Z_{max} and Z_{min} on transmission line?	5	L1

Part-B

Answer All the following questions. (5X10M=50Marks)			
11	Derive the expression of Electric Field Intensity due to infinite line charge of line charge density ρ_l , when the charge is distributed along z axis. [10]	1	L3
OR			
12	a) Derive the continuity equation. [5] b) The point charges -1 nC, 4 nC and 3 nC are located at (0, 0, 0), (0, 0, 1) and (1, 0, 0) respectively. Find the field in the system. [5]	1	L2
13	Explain the Ampere's Circuit law and derive any one applications of Ampere's Circuit law? [10]	2	L3
OR			
14	a) State Faraday's law. Derive transformer EMF. [5] b) Write Maxwell's equations in point form and integral form for time varying fields. [5]	2	L3 L2
15	State and prove Poynting theorem. [10]	3	L3
OR			

16	a) Derive the expression for Reflection coefficient of the perpendicular polarized wave incident obliquely on perfect dielectric medium. [5] b) Determine the phase velocity, attenuation constant, phase constant and intrinsic impedance for a forward travelling wave in a large block of copper at 1 MHz. ($\sigma = 5.8 \times 10^7$, $\epsilon_r = \mu_r = 1$). [5]	3	L3
17	Derive the expression for voltage and current at any point on the transmission line in terms of characteristics impedance. [10]	4	L3
	OR		
18	Derive the transmission line equations for V and I in terms of the source parameters. [10]	4	L3
19	Explain Reflection coefficient and VSWR of a Transmission line. [10]	5	L3
	OR		
20	What is single stub matching? Find the length and location of the single stub to avoid the reflections from the load end. [10]	5	L4